

# NHRC UPDATE

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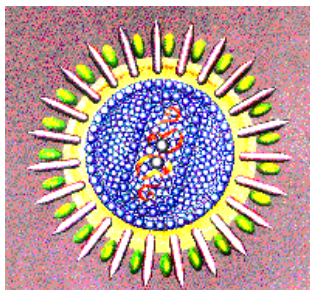
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*This update is being published periodically to highlight a few of the many contributions being made by your friends and colleagues at NHRC and to illustrate the importance of NHRC's work for the Navy and the broader scientific community.*

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## ***NHRC Scientists First to Detect Diverse HIV-1 Genetic Subtypes in the USA***

**C**APT Stephanie Brodine and her colleagues, including Dr. Frank Garland and Stan Ito from NHRC, and researchers from Walter Reed Army Institute of Research Retrovirology Lab, identified the first cases of U.S. natives infected with the HIV-1 strains causing the African and Asian epidemics. This study, published in the November 5, 1995 issue of *Lancet*, used new state-of-the-art laboratory techniques to identify the specific strains or subtypes of HIV. In the U.S. and Europe, nearly all of the HIV viruses are subtype B, whereas the predominant subtypes in Africa are A, C, and D. Subtype E predominates in Thailand. Differentiating HIV subtypes may have important implications in vaccine development, HIV diagnosis, and the epidemiology of the epidemic. Given the wide dispersal of HIV-1 subtypes internationally and the routine occurrence of international travel, it seems inevitable that strains other than subtype B eventually will spread in the USA. NHRC is in a unique position to address the question of the introduction of these divergent HIV subtypes into the U.S. as our HIV Central Registry allows identification of recently acquired HIV infections and our powerful databases enable tracking of personnel and their ships' movements.



In this study, HIV subtype screening was performed on HIV-infected servicemen whom we identified as having deployed to countries such as Kenya, Uganda, and Thailand that have high rates of these other subtypes of HIV. In this procedure, 26 subjects were identified and tested. Of these, 21 individuals were found to be infected with subtype B, and 5 individuals were found to be infected with non-subtype B: 3 with subtype E, 1 with A, and 1 with D. All HIV-infected personnel receive a 2- to 3-week medical evaluation, which includes an intense educational program that emphasizes the essentials for preventing the transmission of HIV.

In another related research study being conducted in conjunction with the University of California, San Francisco, and co-funded by the NIH, a primary prevention program to decrease acquisition of sexually transmitted diseases in Marine Corps personnel on deployment has been developed and shown to have efficacy in reducing risky sexual behaviors in foreign ports. Current efforts are focused on the development of intervention programs to reduce unplanned pregnancies and STDs among women assigned to U.S. Navy ships. As one of our most senior and productive scientists, CAPT Brodine, who also works as a physician on the HIV ward at the Naval Medical Center, continues to set the standard for establishing critical partnerships and conducting world class science.

## The Big Chill

Although Southern California does not immediately spring to mind as the region from which to conduct research on the effects of cold, NHRC is very well situated to execute this mission. Our laboratory at the Ma-



rine Corps Mountain Warfare Training Center in the Eastern Sierras is specially equipped to support both Navy and Army field research with the Marines as they train in the cold. Similarly, our close proximity with the Navy Sea, Air, Land (SEAL) special forces personnel provides access to operational research in the cold waters of the Pacific Ocean. Information gained from more controlled laboratory studies using our thermal chambers can be readily transitioned and evaluated with the operating forces.

In a recent article in the *New England Journal of Medicine*, Dr. Robert Pozos from NHRC, and his colleague Dr. DF Danzl from the University of Louisville, addressed the issue of accidental hypothermia, which is defined as an unintentional decline in a person's core temperature below 35°C. In this article, the authors presented an overview of the pertinent pathophysiology of hypothermia and guidelines for resuscitation and rewarming. In addition to this effort, Dr. Pozos co-authored a chapter titled, "Limits of Tolerance to Hypothermia," in the 1995 edition of the "Handbook of Physiology."

Dr. Don Roberts, who currently is leading our terrestrial cold weather research efforts, and Dr. Pozos recently met with Army experts in Washington to review and update cold weather policy for our troops in Bosnia.

Last spring, four Army special forces personnel died of hypothermia as a result of cold water immersion during Ranger School training. Based on our extensive experience with laboratory and field studies of immersion cold in the SEAL community, NHRC was asked to consult with the Army on this issue. As a result of his "incisive and useful analysis" and "timely and helpful support," Dr. Keith Prusaczyk received a letter of appreciation and an Army coin from the Under Secretary of the Army.

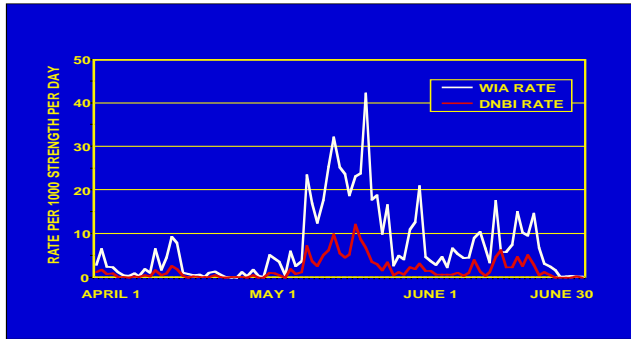
Over the past few years, NHRC's program of cold research has demonstrated its effectiveness in laboratory studies of wet and dry cold, altitude exposure with the Marines in Alaska (CDR Steve Feith, CDR JT Coyne, Dr. Pozos), field exercises with the Norwegian army in the arctic (Dr. Jim Hodgdon, LT Robert Hesslink), SEALs in Alaska and in high-speed boats, and immersion cold with the SEALs in open water swims and SEAL delivery vehicles (Dr. Hal Goforth, Dr. Prusaczyk). Exposure to extremes



remains a professional obligation of our military forces. Understanding the physiological and biomedical effects of these extremes and developing appropriate countermeasures remains a professional obligation of the scientists at NHRC.

## Contingency Medical Planning

Medical and manpower resource planning for military operations, such as Operation Desert Storm, requires that logisticians project the numbers of casualties likely to be sustained from disease or nonbattle injuries, as well as from battle injuries. These projections are central to the prepositioning of medical supplies and equipment, the deployment of appropriate medical personnel, and the distribution of evacuation assets. After compiling enormous files of archival data from World War II, Korea, Vietnam, and the Falkland Islands, Chris Blood and



his colleagues have developed sophisticated statistical models to predict the “pulse and pause” nature of theater-specific engagements that are sensitive to factors such as combat intensity, troop strength and type, and projected length of engagement. In a letter from the Office of the Secretary of Defense, NHRC’s empirically based approach was referred to as “fundamental in shifting not only Navy but all-service and Departmental attitudes toward medical issues as the Department begins adjusting to the post-Cold War environment.” Noting that this work was “far superior to that of the other services,” the letter further recommended that “the robust approach taken within the Navy to apply operations research techniques to medical issues be adopted by the Department in general as well as the other services.”

The methodology developed at NHRC has also been adopted by the Congressional Budget Office in its work on converting patient diagnoses to International Classification of Disease codes. Chris Blood, and his colleagues are frequent contributors to *Military Medicine*, *Military Operations Research Society Symposium*, and *Naval War*

*College Review*. The recent development of a personal computer-based medical casualty forecasting system (FORECAS) will enable the forward migration of this capability to better serve medical planners and practitioners.

## Retrospective...

### Center for Prisoners of War Studies

Near the end of the Vietnam War, the Center for Prisoner of War studies was established at NHRC. This Center was largely responsible for planning and coordinating the repatriation and medical follow-up of all Army, Navy, and Marine Corps POWs, maintaining the classified debriefing material, and conducting medical and family reintegration research.

### Deep Freeze

Just prior to the International Geophysical Year (1957-1958), one of the Antarctic winter-over personnel became overtly psychotic and caused a great deal of difficulty for other station members. This event, coupled with intense interpersonal conflicts occurring at one station, prompted a research requirement for screening, adjustment, and performance studies for Antarctic personnel. In response to this requirement, Dr. Eric Gunderson and his colleagues at NHRC conducted studies that greatly improved the selection of candidates for the 6-month wintering over assignment in Operation Deep Freeze. Antarctica was long regarded as a natural laboratory for the social and behavioral sciences and is regarded by NASA as a unique analogue for future space station operations and extraterrestrial exploration. Dr. Gunderson served as a consultant to NASA for more than 25 years, and his many contributions were recognized when he was asked to write a preface for the volume, “From Antarctica to Outer Space: Life in Isolation and Confinement.”

## **Recent Publications**

### **HIV Program**

Brodine SK, Hyams KC, Molgaard CA, Ito SI, Thomas RJ, Roberts CR, Golbeck AL, Oldfield EC, Blattner WA. The risk of human T-cell leukemia virus and viral hepatitis infection among US Marines stationed in Okinawa, Japan. *J Infect Dis.* 1995;171:693-696.

Malone JL, Wallace MR, LaRocco Jr A, Hendrick BB, Tonon E, Brodine SK, Bowler WA, Lavin BS, Hawkins RE, Oldfield EC. Syphilis and neurosyphilis in a human immunodeficiency virus Type-1 seropositive population: evidence for frequent serologic relapse after therapy. *Am J Med.* 1995;99:55-63.

Brodine SK, Mascola JR, Weiss PJ, Ito SI, Porter KR, Artenstein AW, Garland FC, McCutchan FE, Burke DS. Detection of diverse HIV-1 genetic subtypes in the USA. *Lancet.* 1995;346:1198-1199.

### **Cold Research**

Hackney AC, Coyne JT, Pozos RS, Feith S, Seale J. Validity of urine-blood hydration measures to assess total body water changes during mountaineering in the Subarctic. *Arcctic Medical Research.* 1995; 54:69-77.

Shaw E, Feith S, Coyne JT, Bales B, Pozos RS, Hackney AC. Effects of high altitude exposure in the Subarctic on weight loss and anthropometric measures of body composition. *Israel Journal of Sports Medicine.* 1995;2:173-178.

Danzl DF, Pozos RS. Accidental Hypothermia. *N Engl J Med.* December 29,1994;331:1756-1760.

Pozos, RS, Danzl DF, Iaizzo PA, Mills WT Jr. Limits of tolerance to hypothermia. In Fregley MJ, Blatteis, CM, eds. *Handbook of Physiology.* New York, NY: Oxford University Press; 1996;1(4).

### **Medical Contingency Planning**

Blood CG, Jolly RT, Odowick MS. Casualty incidence during naval combat operations: a matter of medical readiness. *Naval War College Review.* 1996.

Blood CG, O'Donnell ER. A system to project injury and illness incidence during military operations. *J Med Systems.* 1995;19(6): 457-464.

Blood CG, Jolly RT. Comparisons of disease and nonbattle injury incidence across various military operations. *Mil Med.* 1995;160(5):258-263.

Gauker ED, Blood CG. Friendly fire incidents during World War II naval operations. *Naval War College Review.* Winter 1995;48 (1;349):115-22.

Blood CG. Blue on blue: a history of friendly fire [book review]. *Naval War College Review.* 1995.

Blood CG. Filling a lexical void. Phalanx: *The Bulletin of Military Operations Research.* 1995;28(4),22-23.